

SECTION 2

RESOURCE INFORMATION AND AGENCY PROGRAM UPDATES

The tables in this section summarize budgetary information of the Federal government for Fiscal Years 2005 and 2006. The funds shown are those used to provide meteorological services and associated supporting research that has as its immediate objective the improvement of these services. Fiscal data are current as of the end of July 2005 and are subject to later changes. The data for FY 2006 do not have legislative approval and do not constitute a commitment by the United States Government. The budget data are prepared in compliance with Section 304 of Public Law 87-843, in which Congress directed that an annual horizontal budget be prepared for meteorological programs conducted by the Federal agencies.

AGENCY OBLIGATIONS FOR METEOROLOGICAL OPERATIONS AND SUPPORTING RESEARCH

Table 2.1 contains fiscal information, by agency, for meteorological operations and supporting research. The table shows the funding level for Fiscal Year (FY) 2005 based on Congressional appropriations, the budget request for FY 2006, the percent change, and the individual agencies' percent of the total Federal funding for FY 2005 and FY 2006.

DEPARTMENT OF AGRICULTURE (USDA)

The USDA budget request for FY 2006 is \$43.8 million for operations and supporting research, representing a 15.8 percent decrease from FY 2005. A large portion of this decline was due to a reduction in funding for supporting research. USDA has requested a total \$28.3 million for research and development programs, an \$8.4 million decrease from 2005. The FY 2006 amount requested for meteorological operations is \$15.5 million, slightly up from \$15.4 million in FY 2005.

Operational activities include specialized weather observing networks such as the snow telemetry (SNOTEL) system operated by the Natural Resources Conservation Service (NRCS) and the remote automated weather stations (RAWS) network managed by the Forest Service. The SNOTEL and RAWS networks provide cooperative data for NOAA's river forecast activities, the irrigation water supply estimates, and Bureau of

Land Management operations. The Forest Service is also the world leader in developing emissions factors from fires and modeling its dispersion. The USDA and the Department of Commerce (DOC) jointly operate a global agricultural weather and information center located in Washington, D.C. This Joint Agricultural Weather Facility operationally monitors global weather conditions and assesses the impacts of growing season weather on crop and livestock production prospects. This information keeps crop and livestock producers, farm organizations, agribusinesses, state and national farm policy-makers, government agencies, and foreign buyers of agricultural products apprised of worldwide weather-related developments and their effects on crops and livestock. Furthermore, tracking weather and crop developments in countries that are either major exporters or importers of agricultural commodities keeps the agricultural sector informed on potential competitors. USDA is also actively involved in drought monitoring efforts in concert with the National Drought Mitigation Center.

For supporting research, USDA funds research projects through the Cooperative State Research, Education and Extension Service (CSREES) that study the impact of climate and weather on food and fiber production. The goal of supporting research is to

develop and disseminate information and techniques to ensure an abundance of high-quality agricultural commodities and products while minimizing the adverse effects of agriculture on the environment. Furthermore, the Agricultural Research Service (ARS) conducts research on how annual variation in weather adversely affects crop and animal production, hydrologic processes, the availability of water from watersheds, and the environmental and economic sustainability of agricultural enterprises.

DEPARTMENT OF COMMERCE (DOC)

All reported DOC meteorological activities are within the National Oceanic and Atmospheric Administration (NOAA). The NOAA FY 2006 total congressional request of \$1.93 billion for meteorological programs represents an increase of 5.2 percent over the FY 2005 appropriated funds. NOAA's FY 2006 operations and supporting research requests for major line office activities are described below:

WEATHER SERVICES

NOAA's National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas for the protection of life and property and the enhancement of the national economy.

TABLE 2.1 METEOROLOGICAL OPERATIONS AND SUPPORTING RESEARCH COSTS*, BY AGENCY
(Thousands of Dollars)

AGENCY	Operations			% of FY2006			Supporting Research			% of FY2006			Total			% of FY2006		
	FY2005	FY2006	%CHG	FY2006	TOTAL	%	FY2005	FY2006	%CHG	FY2006	TOTAL	%	FY2005	FY2006	%CHG	FY2005	FY2006	TOTAL
Agriculture	15355	15535	1.2	0.5			36702	28280	-22.9	7.3			52057	43815	-15.8	1.6	1.3	
Commerce/NOAA(Subtot)	1727721	1839769	6.5	61.6			107038	89939	-16.0	23.3			1834759	1929708	5.2	56.0	57.2	
NWS	782981	839263	7.2	28.1			22140	23380	5.6	6.1			805121	862643	7.1	24.6	25.6	
NESDIS	907448	963886	6.2	32.3			31039	26214	-15.5	6.8			938487	990100	5.5	28.7	29.3	
OAR	0	0	0	0.0			52203	38689	-25.9	10.0			52203	38689	-25.9	1.6	1.1	
NOS	23802	23130	-2.8	0.8			500	500	0.0	0.1			24302	23630	-2.8	0.7	0.7	
NMAO	13490	13490	0.0	0.5			1156	1156	0.0	0.3			14646	14646	0.0	0.4	0.4	
Defense(Subtot)	622256	619646	-0.4	20.7			64080	71803	12.1	18.6			686336	691449	0.7	21.0	20.5	
Air Force	293220	309401	5.5	10.4			16752	28675	71.2	7.4			309972	338076	9.1	9.5	10.0	
DMSP**	88038	84121	-4.4	2.8			3816	918	-75.9	0.2			91854	85039	-7.4	2.8	2.5	
Navy	170191	179809	5.7	6.0			28512	32312	13.3	8.4			198703	212121	6.8	6.1	6.3	
Army	70807	46315	-34.6	1.5			15000	9898	-34.0	2.6			85807	56213	-34.5	2.6	1.7	
Homeland Security (Subtot)	23890	25020	4.7	0.8			0	0	0.0	0.0			23890	25020	4.7	0.7	0.7	
USCG	23890	25020	4.7	0.8			0	0	0.0	0.0			23890	25020	4.7	0.7	0.7	
Interior/BLM	2400	2400	0.0	0.1			0	0	0.0	0.0			2400	2400	0.0	0.1	0.1	
Transportation(Subtot)	460434	483450	5.0	16.2			26215	24506	-6.5	6.3			486648	507956	4.4	14.9	15.1	
FAA	460293	483027	4.9	16.2			22145	21506	-2.9	5.6			482437	504533	4.6	14.7	15.0	
FRA	141	423	200.0	0.0			0	0	0.0	0.0			141	423	200.0	0.0	0.0	
FHWA	0	0	0.0	0.0			4070	3000	-26.3	0.8			4070	3000	-26.3	0.1	0.1	
EPA	0	0	0.0	0.0			9000	9000	0.0	2.3			9000	9000	0.0	0.3	0.3	
NASA	2608	2615	0.3	0.1			176000	162600	-7.6	42.1			178608	165215	-7.5	5.5	4.9	
NRC	120	120	0.0	0.0			0	0	0.0	0.0			120	120	0.0	0.0	0.0	
TOTAL	2854783	2988554	4.7	100.0			419035	386128	4.0	100.0			3273818	3374682	3.1	100.0	100.0	
% of FY TOTAL	87.2%	88.6%					12.8%	11.4%					100.0%	100.0%				

*The FY 2005 funding reflects Congressionally appropriated funds; the FY 2006 funding reflects the amount requested in the President's FY 2006 budget submission to Congress.

**DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

NWS data and products form a national information database and infrastructure which can be used by other government agencies, the private sector, the public, and the global community.

The United States is one of the most severe-weather prone countries on Earth. Each year, Americans cope with an average of 10,000 thunderstorms, 2,500 floods, 1,000 tornadoes, as well as 6 deadly hurricanes. Some 90% of all Presidential-declared disasters are weather related, causing approximately 500 deaths per year and \$11 billion in damage. According to the American Meteorological Society, weather is directly linked to public safety and about one-third of the U.S. economy (about \$3 trillion) is weather sensitive.

More and more sectors of the U.S. economy recognize the impacts of weather, water, and climate on their businesses, and are becoming more sophisticated at using weather, water, and climate information to make better decisions. To meet this growing demand for information and to improve the timeliness and accuracy of warnings for all weather-related hazards, the NWS will continue to enhance observing capabilities, improve data assimilation to use effectively all the relevant data NWS and others collect, improve collaboration with the research community, make NWS information available quickly, efficiently, and in a useful form (e.g., the National Digital Forecast Database) and include information on forecast uncertainty to help customers make fully informed decisions.

With about 4,700 employees in 122 weather forecast offices, 13 river forecast centers, 9 national centers and other support offices around country, NWS provides a national infrastructure to gather and process data worldwide from the land, sea, and air. This infrastructure enables data collection using technologies such as Doppler weather

radars, satellites operated by NOAA's National Environmental Satellite, Data, and Information Service (NESDIS), data buoys for marine observations, surface observing systems, and instruments for monitoring space weather and air quality. This data feeds sophisticated environmental prediction models running on high-speed supercomputers. Our highly trained and skilled workforce uses powerful workstations to analyze all of these data to issue climate, public, aviation, marine, fire weather, air quality, space weather, river and flood forecasts and warnings around-the-clock. A high-speed communications hub allows for the efficient exchange of these data and products between NWS components, partners and customers. NWS forecasts and warnings are rapidly distributed via a diverse dissemination infrastructure, including NOAA Weather Radio. Finally, customer outreach, education, and feedback are critical elements to effective public response and improvements to NWS services.

The FY 2006 President's Budget Request supports the funding and program requirements necessary to address established NOAA strategic goals and sets NWS on a path to achieve its vision: Produce and deliver forecasts that can be trusted; use cutting-edge technologies; provide services in a cost-effective manner; strive to eliminate weather-related fatalities; and improve the economic value of weather, water, and climate information.

NOAA requests a total of \$744,830,000 and 4,597 FTE to support the continued and enhanced operations of the National Weather Service. The total includes \$33,433,000 for Adjustments to Base, \$20,946,000 for Program increases, and \$13,475,000 for Terminations.

Adjustments To Base:

NOAA requests an increase of \$33,433,000 and a decrease of 3 FTE

to fund adjustments to base for NWS activities. The increase will fund the estimated FY 2006 Federal pay raise of 2.3 percent and annualize the FY 2005 pay raise of 3.5 percent. The increase will also provide inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration.

The above amount includes several transfers:

- \$3,200,000 to reflect the transition of the Tropical Atmosphere Ocean (TAO)-Array from NOAA Research to an operational mode in the NWS. This buoy array, located in the Pacific Ocean, provides real-time in-situ data from the tropical Pacific Ocean for monitoring, prediction, and improved understanding of El Niño. Having demonstrated its viability as a research activity, NOAA seeks to transfer the array into operations. NWS is best position to operate and maintain the array.

- \$500,000 from Office of Atmospheric Research (OAR) to return funding for the U.S. Weather Research Program to NWS.

- \$7,390,000 from Program Support, Facilities Maintenance to fund WFO maintenance in NWS, where it has traditionally been appropriated.

- \$20,000 to Office of Marine and Aviation Operations (OMAO) for partial funding of a NOAA Corps Officer position that benefits NWS.

- \$37,000 and 3 FTE to the Office of General Counsel within Program Support.

NWS - ORF Program Change Highlights for FY 2006:

NOAA requests a net increase of \$20,946,000 and 0 FTE over the FY 2006 base for a total request of \$744,830,000 and 4,597 FTE. These changes are summarized at the sub activity level below.

Operations and Research.

A net increase of \$18,010,000 and

0 FTE above the base is requested in the Operations and Research subactivity, for a total of \$652,287,000 and 4,415 FTE.

- Local Warnings and Forecasts: \$14,975,000 and 0 FTE in net increases above the base, for a total of \$602,395,000 and 4,116 FTE, are requested under the Local Warnings and Forecasts line item of the Operations and Research subactivity.

- NOAA requests \$5,970,000 and 0 FTE to strengthen the U.S. tsunami warning program. Lessons learned from the 2004 Indian Ocean Tsunami indicate that to mitigate a similar event in the U.S., the following actions are required: 1) quickly confirm potentially destructive tsunamis and reduce false alarms; 2) address local tsunami mitigation and the needs of coastal residents; 3) improve coordination and exchange of information to better utilize existing resources; and 4) sustain support at state and local level for long-term tsunami hazard mitigation. This funding will be used to begin the planned deployment of the 32 deep ocean assessment and reporting of tsunamis (DART) buoys for the Pacific Ocean Basin and the Caribbean/Atlantic Ocean region, next generation DART buoy research and development, and for upgrades and operations and maintenance of sea level monitoring sensors. Funds will also be used to provide for 24/7 operations at the Richard H. Hagemeyer Pacific Tsunami Warning Center (PTWC), the West Coast/Alaska Tsunami Warning Center (WC/ATWC), upgrade the operations of the NWS International Tsunami Information Center (ITIC), and to expand the U.S. Tsunami Ready Community efforts on the East and West Coasts.

- NOAA requests \$4,000,000 and 0 FTE to begin efforts to develop a nationwide water resources forecasting capability. Through this capability, NOAA will provide America with eco-

nomically valuable water and soil condition forecasts via: 1) a national digital database incorporating assimilation of all available hydro-meteorological data and observations; and 2) a community hydrologic prediction system (CHPS) necessary to advance water prediction science. This will allow NOAA's research and development enterprise and operational service delivery infrastructure to be integrated and leveraged with other federal water agency activities to form the basis of a national backbone water information system. The initiative provides the water modeling capability to support the U.S. Commission on Ocean Policy mandate for a national water quality monitoring and prediction system. Furthermore, the initiative enables NOAA to deliver a national database of drought analyses and predictions, and generate user friendly Geographical Information System (GIS) products for monitoring drought. The initiative will provide water users - farmers, utilities, land managers, business owners, and decision makers - the ability to assess water availability in real time and make informed decisions to mitigate impacts of extreme water events, (e.g., droughts).

This initiative is expected to provide a return of \$12 annually for each \$1 invested due to improved decisions associated with irrigation scheduling and water supply management (National Hydrologic Warning Council, May 2002). NOAA's NWS is the only federal entity positioned to lead this activity because of its unique capabilities in data acquisition and processing, existing operational water modeling infrastructure, and robust national service delivery system to provide predictions of water resource variables for forecast periods of hours to months.

- NOAA Requests \$2,072,000 and 0 FTE, for a total of \$6,790,000 to accelerate nationwide implementation of ozone air quality (AQ) forecasting capability from FY 2009 to FY 2008

and to deliver an initial particulate matter forecasting capability by FY 2011. Of the increase requested, \$1,290,000 is requested in the U.S. Weather Research Program and \$782,000 is requested in the Air Quality Forecast program, for a total of \$1,290,000 in the U.S. Weather Research Program (USWRP) and \$5,500,000 in the Air Quality Forecast program. The effect of poor air quality on the national economy is estimated at \$150 billion/year from health effects alone. Accurate air quality forecast guidance, provided in time to take action, can lead to significant savings in these costs. For example, if the public has advance warning of the onset of poor air quality conditions, mitigating actions can be taken, such as not jogging or engaging in other outdoor activity. NWS and OAR are working closely together to develop and deliver these new capabilities. This funding will accelerate benefits to the public. Accelerating deployment of particulates predictions will provide, one year earlier than currently planned, the information needed for people to take protective actions against a significant health risk - a risk that is especially harmful for those with cardiac and respiratory ailments.

- NOAA Requests and additional \$1,115,000 for the U.S. Weather Research Program (above the amount requested to accelerate AQ forecasting - see above) and 0 FTE for a total of \$7,457,000 to accelerate improvements in global weather forecasting and accelerate hurricane and other high-impact weather research activities. This increase will restore funding to the USWRP and The Observing-system Research and Predictability Experiment (THORPEX) requested in FY 2005. Key activities directed to hurricane forecasting and research include development, testing, and transition to operations of the hurricane weather research and forecasting (HWRP) community model that promises to sig-

nificantly improve predictions of the intensity and precipitation of hurricanes at landfall. Other activities include testing and development of promising hurricane research at the Joint Hurricane Testbed, which can be adopted to improve warnings and forecasts by operations centers and numerical assimilation of tropical cyclone data for use in numerical weather prediction models.

- NOAA requests an increase of \$1,100,000 and 0 FTE for a total of \$3,500,000 to continue a 10-year plan to improve U.S. aviation safety and economic efficiencies by providing state-of-the-art weather observation and forecast products responsive to aviation user needs. This increase will allow the NWS to procure, install and operate 50 aircraft based water vapor data systems. Water vapor information is critical to depicting weather hazards and reducing forecast errors. This initiative addresses Federal Aviation Administration (FAA) joint safety implementation team (JSIT) recommendations and provides a means for NWS to improve its aviation weather forecast services through three major efforts: 1) increase the number and quality of aviation weather observations; 2) transition successful NOAA, National Aeronautics and Space Administration (NASA) and FAA applied research efforts to operational products; and 3) develop and implement new training programs for forecasters, pilots, and controllers. The aviation program has the FY 2012 goal of a 10% reduction in National Airspace System (NAS) weather-related air traffic delays, which would save \$1 billion annually in potential economic losses, while also reducing general aviation weather related fatalities by 25% or 50 lives annually. The Airline Transport Association estimates \$10 billion lost to the U.S. economy each year due air-traffic delays.

- NOAA requests an increase of \$298,000 and 0 FTE for a total of

\$6,098,000 for the Advanced Hydrologic Prediction Service (AHPS). AHPS is NOAA's program to modernize the river forecasting capability and expand it to new waterways. This increase will restore funds requested in FY 2005. With full funding for FY 2006, AHPS will provide enhanced river forecasts, including web accessible displays of probabilistic information, for 308 additional locations throughout the Southeast, South, and West. AHPS priorities are to sustain current hydrological services, deliver more precise forecasts with magnitude and certainty of occurrence information, leverage collaborative research to infuse new science, and provide better water information to benefit the public and the Nation's commerce. Through AHPS, NOAA's NWS will deliver better forecast accuracy; more specific and timely information on fast-rising floods; new types of forecast information; longer forecast horizons; easier to use products; increased, more timely, and consistent access to products and information and expanded outreach.

- Central Forecast Guidance: \$3,035,000 and 0 FTE in net increases above the base, for a total of \$49,892,000 and 299 FTE, are requested under the Central Forecast Guidance line item of the Operations and Research subactivity.

- NOAA requests \$1,000,000 and 0 FTE to fund focused research, development, and testing of advanced data assimilation algorithms and techniques. Expected improvements include: development of advanced techniques in global and mesoscale atmospheric, ocean and land data assimilation systems; use of new satellite data from the National Polar-orbiting Operational Environmental Satellite System (NPOESS), the NPOESS Preparatory Project and European operational instruments; and increased use of high resolution surface and radar observations for initializing high resolution mesoscale forecasts. Cur-

rent resources are insufficient to fully utilize current and future observations including radar and satellite data, and inadequate for finer resolution forecast applications. This investment has the potential to provide breakthroughs in storm track prediction performance, as well as increasing the realism of all parts of the systems and improving forecast accuracy across the board. Outcomes include improved winter storm warnings, precipitation forecasts, and lead-times for flash flood and Red Flag warnings.

- NOAA requests \$2,035,000 and 0 FTE to provide for the cyclic replacement of information technology (IT) infrastructure at the National Centers for Environmental Prediction (NCEP) in order to enable the effective use of increasing volumes of model guidance, imagery and observational data and to comply with IT security requirements and related challenges which are projected to increase through the FY06 - FY07 timeframe. By FY06, current resources devoted to NCEP IT cyclic replacement will be insufficient to meet projected data volume demands related to ensemble model systems for weather and climate forecasts and the expanding suite of ocean and coastal model forecasts. The IT cyclic replacement program for operational systems will entail replacement of PCs, workstations, servers, and operating systems to meet data volume demands and ensure against interference from hackers and denial of service attacks.

Systems Operation & Maintenance (O&M)

A net increase of \$2,936,000 and 0 FTE above the base is requested in the Systems Operation & Maintenance subactivity, for a total of \$92,543,000 and 182 FTE.

- NOAA requests an increase of \$2,936,000 and 0 FTE for a total of \$43,367,000 for NEXRAD Operations and Maintenance. NEXRAD is the cornerstone of the NWS Moderniza-

tion and this increase will restore funds requested in FY 2005 for operations and maintenance of the NEXRAD system. Specifically, the requested increase will allow the NWS to implement planned retrofits to WSR-88D communications lines (copper to fiber optic) at 8 sites where deteriorating copper lines make communications unreliable, thus creating a moderate to high risk of communications failure and lost radar data (particularly during severe weather events). Furthermore, NWS will be able to perform planned radar radome and tower maintenance, eliminating the risk of catastrophic radar failure due to lack of structural integrity.

Systems Acquisition

- NOAA requests an increase of \$3,530,000 and 0 FTE for a total of \$3,530,000 to strengthen the U.S. Tsunami Warning Program. This budget request completes the Administration's 2-year plan to strengthen the U.S. tsunami warning program in light of the December 26, 2004 Indian Ocean Tsunami. Funds will be used to complete the planned acquisition of deep ocean assessment and reporting of tsunamis (DART) buoys for the Pacific Ocean Basin and the Caribbean/Atlantic Ocean region. Expanded monitoring capabilities throughout the entire Pacific and Caribbean basins and significant portions of the mid Atlantic will provide tsunami warning capability for regions bordering half of the world's oceans.

COOP Modernization

- NOAA is requesting an increase of \$3,400,000 and 0 FTE with a total FY 2006 funding of \$4,277,000 for the Cooperative Observer Network Modernization (COOP), to continue deployment of modernized COOP sites nationwide as NWS implements the "NOAA Environmental Real Time Observation Network" (NERON). NERON will provide the U.S. with a network of accurate, near real-time surface weather data (temperature and

precipitation) obtained with state-of-the-art measurement, monitoring, and communication equipment. Quality-controlled, higher-density, real-time surface data will improve temperature forecasting skills, drought monitoring resolution, hydrology planning, and energy optimization for NWS customers. Improved sensors, including wind data, can provide timely data in response to homeland security events or disasters. NERON continues the COOP modernization, begun in FY 2003, and will result in deployment or upgrade of up to 8,000 modernized sites.

- NOAA requests an increase of \$5,650,000 and 0 FTE to complete and to sustain NOAA Weather Radio (NWR). Funds will be used to complete NWR broadcast coverage of all areas in the U.S. identified as at high risk of severe weather events, by establishing 17 new broadcasting stations. Additionally, funds will be used to improve network reliability by refurbishing 400 stations established in the 1970s. NOAA is working with the Department of Homeland Security, to make NWR a national all-hazards warning network of 900 broadcasting stations and reaching 97% of the nation's population.

- NOAA requests an increase of \$1,497,000 and 0 FTE to establish a Coastal-Global Ocean Observing System (C-GOOS) in the NWS. The C-GOOS Program fulfills the U.S. coastal component of the international GOOS effort and addresses the mandate of the President's Commission on Ocean Policy and the National Oceanographic Partnership Program to bring together government, industry and academia. In FY 2005 Congress provided NOS \$8,000,000 to add oceanographic sensors to the existing NWS marine observational backbone. In FY 2006, NOAA's C-GOOS will deploy new buoys, add the capability to enhance future buoys with biological and chemical oceanographic sen-

sors to allow biological and chemical water sampling; provide information on locations of marine endangered or protected species; and monitor coral reef health.

- NOAA requests no change to the \$19,285,000 base for Weather and Climate Super-computing. The cyclical upgrade of the NWS weather and climate supercomputing capability is intended to procure the computing and communications equipment needed to receive and to process the increasing wealth of environmental data acquired by modernized observing systems, and to support more sophisticated numerical weather prediction models, and stay current with the available super-computing technology. Execution of this program promotes public safety and the protection of property by providing the NCEP with the computer systems that are capable of producing more accurate, NWS climate and numerical weather prediction (NWP) guidance products for hurricanes, severe thunderstorms, floods, and winter storms. Additionally, the super-computing system more accurately forecasts large-scale weather patterns in the medium (3 to 10 days) and extended range (30 days), plus forecasts of major climate events such as El Niño and La Niña. In addition, the computer upgrades will improve the delivery of products to the field and provide system users with enhanced productivity. These products and services will lead to significant economic benefits for users, like the agriculture, construction, and transportation industries.

- NOAA requests no change to the \$7,148,000 base for the Weather and Climate Supercomputing Backup. Because of the critical need of the weather and climate output, it is essential that a backup capability be operational, as part of contingency planning. Automated Surface Observing System

- NOAA requests no change to the \$4,675,000 base for the Automated

Surface Observing System (ASOS). This acquisition is a tri-agency program involving NOAA, DOD, and FAA. ASOS provides reliable, 24-hour, continuous surface weather observations. Under the product improvement portion of this acquisition program, NOAA is developing new ASOS sensor capabilities in order to meet changing user requirements and decrease maintenance demands. FY 2006 funding will complete enhanced precipitation identifier sensor deployment of 282 units and acquire and deploy 68 25,000 foot ceilometers.

- NOAA requests no change to the \$12,894,000 base for the Advanced Weather Interactive Processing System (AWIPS)/NOAAPort. AWIPS is the cornerstone of the modernized NWS. This system integrates and displays all hydrometeorological data at NWS field offices. AWIPS acquires and processes data from modernized sensors and local sources, provides computational and display functions at operational sites, provides an interactive communications system to interconnect NWS operational sites, and disseminates warnings and forecasts in a rapid, highly reliable manner. This system integrates satellite and radar data more fully and provides to the local field forecaster a capability that significantly improves forecasts and warnings. NOAAPort offers the communications capability to provide internal and external users with open access to much of NOAA's real-time environmental data.

Current AWIPS processing, communications, and storage capacity is inadequate to support current and future system processing demands from the three sources listed above. These pre-planned and ongoing NOAA investments in modeling, satellite instruments, and radar improvements (NEXRAD Product Improvement) represent NOAA's commitment to bring forecasters the data and informa-

tion required to improve forecast accuracy and warning lead times.

System-wide information technology investments are necessary to equip NWS forecast offices with the necessary computer performance and capacity to achieve planned and evolving operational and strategic requirements. Planned improvements in the NWS Tornado Warning Lead Time, Flash Flood Warning Lead Time and Winter Storm Warning Lead Time goals can only be realized through the following actions: improve AWIPS system throughput; add new and improved science; and exploit more accurate and higher resolution data and weather forecast model information. To accomplish this, we must improve AWIPS system's performance and capacity. Current choke points in system performance and capacity have been identified in the following areas: workstation and server performance, network throughput, and software architecture.

Improvements in system throughput can be realized by increasing processing and network capacity. Exploitation of new science requires radar, satellite and model data in addition to processing capacity and the ability to quickly and cost-effectively integrate improved decision assistance tools into the AWIPS software. High-resolution data and model information requires additional communications bandwidth, processing and mass storage capacity. For example, the satellite broadcast network (SBN) does not have the capacity to distribute the entire suite of current Eta-12 data, let alone the higher resolution models and products anticipated in FY 2006 such as WRF-8. Insufficient resolution is a serious limitation in providing timely, accurate forecasts and warnings to the public.

Next Generation Weather Radar

- NOAA requests a decrease \$2,360,000 and 0 FTE for a FY 2006 total of \$8,460,000 for Next Generation Weather Radar (NEXRAD). The

total decrease reflects the completion of contract obligations for open systems radar detection (ORDA) and a ramp-up in dual-polarization development efforts. The FY 2006 plan provides for the deployment of 101 ORDA units and award of the dual polarization development and production contract.

- NOAA requests a decrease of \$2,012,000 and 0 FTE for the NWS Telecommunications Gateway (NWSTG) Legacy Replacement with the completion of one-time costs planned for the deployment of the NWSTG Legacy Replacement. The remaining \$0.5M is needed to provide a cyclical information technology refresh capability and to avoid future costly NWSTG system upgrades. NWSTG is the communications hub for collecting and distributing weather information to NWS field units and external users. Replacing the NWSTG system with up-to-date technology will reduce current delays in collecting and disseminating data. In FY 2006, NWS will conclude the three-year NWSTG replacement effort at NWS facilities.

Radiosonde Network Replacement

- NOAA requests a decrease of \$1,989,000 and 0 FTE for a FY 2006 total of \$4,387,000 for Radiosonde Replacement Program to reflect the reduced scope of total radiosonde acquisition. The FY 2006 Budget will modernize 84 out of 102 sites, and will allow a second GPS balloon-borne instrument (radiosonde supplier contract) to be awarded. The NWS radiosonde network provides upper-air-weather observations; the primary source of data required by NWS numerical weather prediction models, which form the basis of all NWS forecasts for day 2 and beyond. Observations of temperature, pressure, humidity, and wind speed/direction are taken twice a day at 102 locations nationwide and in the Caribbean using a radiosonde which transmits the data via radio signal to a ground receiving

station usually located at a WFO, where it is processed.

Construction

- NOAA requests an increase of \$6,200,000 and 0 FTE for a total of \$8,500,000 to finalize the design and implementation of the construction of the NOAA Center for Weather and Climate Prediction (NCWCP). The FY 2006 funding covers the critical long lead procurements for data and communications infrastructure that will be installed in the building during construction and for furnishings, fixtures and equipment that must be procured prior to the completion of construction. Lastly, the funding will be used for project management tasks supporting technical oversight of the design and construction process and the detailed planning necessary to execute the relocation of critical 24x7 operational systems without service interruption. The funding is critical to ensure project continuity for work initiated in FY 2004. Final occupancy of the NCWCP is scheduled for February 2008.

The NWS has had positive results from co-locating its facilities with academic institutions or laboratories in accelerating research into operations and in improving performance. This includes accelerated use of global satellite data through state-of-the-art data assimilation systems; improved model forecasts; decreased time to infuse new science into operations from 7-10 years to 1-3 years.

NCWCP is a new facility to replace the current World Weather Building with a new state-of-the-art facility to meet the operational requirements of NCEP, NESDIS's Office of Research and Applications and Satellite Services Division, and the OAR's Air Resources Laboratory. The Department of Commerce, the State of Maryland, and academic community advisors have all agreed on a shared vision to build a Center of Excellence for Environmental Research, Education, Applications and Operations at a location in subur-

ban Maryland near an academic research institution with the following objectives: meet NOAA operational requirements; create research synergy in weather and climate prediction; accelerate transition of new science and technology into operations; increase interaction between students and professors; and enhance recruitment opportunities.

FY 2004 funding for the NCWCP enabled NOAA to support the General Services Administration to award a build-to-suit lease for the NOAA NCWCP during FY 2004 and includes necessary "above standard" construction costs. The FY 2005 lease award for NCWCP will ensure occupancy of the new facility by 2008 when the current World Weather Building lease expires.

- NOAA requests an increase of \$630,000 for a total of \$13,630,000 and 0 FTE for the Weather Forecast Office (WFO) Construction, to meet NWS WFO facility requirements. WFO construction, part of the NWS modernization and associated restructuring, began in the 1980s. Required construction elements currently ongoing include the upgrade and modernization of Alaska and Pacific Region Weather Service Offices, Tsunami Warning Centers, and associated employee housing units, upgrades of Heating, Ventilation, and Air Conditioning (HVAC) systems, uninterruptible power supply replacements, and mitigation of all building and fire code violations. This construction effort is essential to bring the NWS into full compliance with federal law and municipal codes. In FY 2006, WFO Construction will focus on continuing to modernize the Alaska and Pacific Region facilities, as well as HVAC upgrades and correcting safety code violations at facilities.

- NOAA requests a decrease of \$11,255,000 and 0 FTE for the Suitland Facility, leaving no funding in FY 2006.

ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICES

Proposed funding for FY 2006 includes a decrease in the Polar-Orbiting Satellite Program (POES) of \$3.1 million, a net increase in the Geostationary Satellite Program (GOES) of \$52.6 million, and an increase in the National Polar-Orbiting Operational Environmental Satellite Systems (NPOESS) of \$16.1 million. These changes allow for continuation of procurements to provide the spacecraft and instruments, launch services, and ground systems necessary to assure continuity of environmental satellite coverage. The budget request will maintain a system of polar-orbiting satellites that obtains global data and a system of geostationary satellites that provides near-continuous observations of the Earth's western hemisphere.

Funding for the POES program is decreasing as it approaches the end of its production cycle with two remaining satellites to be launched. The GOES request includes a decrease of \$30.4 million for the GOES-N series of satellites, and an increase of \$83.0 million for the next generation GOES-R series. The FY 2006 GOES-R funding will begin engineering for several key instruments and continue the imager production begun in FY 2005. Another \$16.1 million in funding is included for NOAA's share of the NPOESS program - the converged NOAA and Department of Defense (DOD) polar-orbiting system that will replace the current NOAA series and the DOD Defense Meteorological Satellite Program (DMSP).

A total of \$100.3 million is included in the budget request to maintain basic mission satellite services including maintenance and operation of satellite ground facilities; provision of satellite-derived products, including hazards support; and conduct of research to improve the use of satellite data.

Included in the above request is \$4.0 million to continue the Ocean Remote Sensing Program, which began in FY 1995. During the next several years, NOAA will acquire data from foreign and other non-NOAA satellites that will provide measurement of ocean currents, surface winds and waves, subsurface temperature and salinity profiles, ice thickness and flows, and other marine factors.

An additional \$53.7 million is included in the budget request for the NOAA Data Centers and Information Services subactivity base operating funds.

NOAA OCEAN SERVICE (NOS).

NOS operational oceanographic observing systems are designed to measure both oceanographic and meteorological parameters in order to meet user and partner requirements. As a result, users of the data and information support a broad cross-cut of the marine transportation sector, the climate change research sector, weather and water programs, and ecosystems research community.

Funding provided through the FY 2005 budget will allow the continuation of the second generation of the NOS CO-OPS advanced data quality control program, the Continuous Operational Real-time Monitoring System (CORMS AI), as well as the continued implementation of the Ocean Systems Test and Evaluation Program (OSTEP), which is a development program for bringing new sensor technology into operations. The FY 2005 budget has allowed for sufficient support to operate the National Water Level Observation Network (NWLON) and for continued growth of the Physical Oceanographic Real-Time System (PORTS). Both the NWLON and PORTS programs have subsets of operational water level stations with meteorological sensors installed for various partners and users, including the NWS.

Under the NOAA-Wide Coastal Storms Program (CSP), targeted stations of existing federal and state tide station networks have been funded to be enhanced with new meteorological sensors. Under a NOAA Ocean Service Partnership Proposal first funded in FY 2002, a subset of the NWLON in the Great Lakes was enhanced with new meteorological sensors and with continuous GPS. Previously, special, water level stations were enhanced with meteorological sensors in the Gulf of Mexico with funding from the NWS Southern Region.

In FY 2005, NOS is using some of the IOOS funding to upgrade and enhance the NWLON and continues to work cooperatively with the NWS National Data Buoy Center to establish common collection and quality control procedures and data streams for meteorological and water level data from NOS and NDBC observing systems. NOS operational nowcast/forecast modeling activities are expanding and rely upon NWS Eta model data streams as hydrodynamic model drivers. NOS is cooperating with NWS and OAR in developing a nowcast/forecast capability for the Great Lakes.

OFFICE OF ATMOSPHERIC RESEARCH (OAR).

Requested funding for FY 2006 for Weather and Air Quality research is \$38.7 million--a decrease of \$13.5 million or more than 25 percent from the FY 2005 enacted level. Increases consist of upward base adjustments of \$2.7 million to partially cover inflationary cost increases, plus a critical \$1.7 million program increase for Air Quality Assessments. Proposed decreases include \$1.5 million from Weather & Air Quality Research Laboratories and Joint Institutes and \$1.0 million from Weather and Air Quality Research Programs (Phased-Array Radar) for amounts provided in excess of the FY 2005 request. In addition,

terminations totaling \$15.0 million are proposed for: Atmospheric Investigation Regional Modeling Analysis and Prediction (AIRMAP) (\$4.9 million); New England Air Quality Study (\$2.0 million); Targeted Wind Sensing (\$2.0 million); Risk Reduction in Water Forecasts at Mississippi State University (\$2.0 million); New England Center for the Study of Atmospheric Sciences and Policy (\$1.5 million); FY 2005 hurricane research supplemental (\$1.0 million); the "STORM" Program at the University of Northern Iowa (\$0.6 million); Remote Sensing Research at the Idaho State University/Boise Center Aerospace Laboratory (\$0.5 million); East Tennessee Ozone Study (\$0.3 million); and the Central California Ozone Study (\$0.2 million).

Finally, since NOAA proposed transferring the U.S. Weather Research Program (USWRP) to the National Weather Service (NWS) in FY 2005, the \$0.5 million of USWRP funding enacted in FY 2005 in the OAR budget is being proposed for transfer to NWS in the FY 2006 request. Last year's requested transfer to NWS of the Space Environment Center (\$5.3 million and 51 FTE) was enacted as requested.

NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM (NPOESS).

The FY 2006 DOC/DOD budget request for NPOESS is \$644.7 million. FY 2006 funds will be used for the continued development of system architecture, technology development efforts, and critical sensor and algorithm development. NPOESS is planned to be launched in FY 2011. This system will exploit advanced hardware and software technologies to produce a more reliable, longer-lived spacecraft with greater mission capability. In addition to new products, NPOESS will also provide a signifi-

cant reduction (90 minutes to 30 minutes) in the time required to move from sensed to processed data.

NOAA MARINE AND AVIATION OPERATIONS (NMAO).

NMAO supports meteorological activities by collection of related data from ships and aircraft. The FY 2006 President's Budget does not include any significant increases or decreases from the FY 2005 appropriation for NMAO that are related to meteorological data collection.

DEPARTMENT OF DEFENSE (DOD)

The DOD total budget request for FY 2006, excluding NPOESS funding, is \$691.4 million which represents a funding increase of 0.7 percent from FY 2005. Specific highlights for each of the military departments are described below:

U.S. AIR FORCE.

United States Air Force (USAF) resources for meteorological support fall into several categories: general operations, investment and research, Defense Meteorological Satellite Program (DMSP) operations, and DMSP and National Polar-orbiting Operational Environmental Satellite System (NPOESS) supporting research. The total USAF request for FY 2006, including DMSP and NPOESS, is \$699.0 million.

General Operations: The operations portion (USAF and DMSP) of the FY 2006 budget request is \$393.5 million and funds day-to-day environmental support to the DOD, including the active and reserve components of the Air Force and Army, nine unified commands, and other agencies as directed by the Chief of Staff of the Air Force. Just over 4,400 Active and Reserve Component military and civilian personnel conduct these activities at

more than 290 locations worldwide. Approximately 85 percent of personnel specialize in weather; the remainder includes communications, computer, administrative, and logistics specialists.

General Supporting Research: The FY 2006 budget request for supporting research is \$28.7 million. The increase in funding over FY 2005 is a result of research and development efforts related to NPOESS. In 2006, Air Force Weather begins data ingest, analysis, and modeling research efforts in preparation for the launch of the NPOESS Preparatory Project (NPP) satellite and the first fully operational NPOESS satellite in 2010. A key systems development effort in FY 2006 is the development of the Joint Environmental Toolkit (JET). JET will provide a single common forecaster interface to the virtual Joint METOC Database (JMDB) for use at all levels of the Air Force Weather support structure. Additionally, it will integrate with joint and coalition command and control and mission planning systems by enabling machine-to-machine exchange of METOC data and information to meet operational planning and execution requirements. Final source selection and contract award is to take place by October 2005.

DMSP Operations: Though funding for DMSP comes from the USAF, this system is a major source of space-borne meteorological data for all the military services and other high-priority DOD programs. DMSP environmental data is also distributed to the National Weather Service (NWS), National Environmental Satellite, Data, and Information Service (NESDIS), the Navy's Fleet Numerical Meteorology and Oceanography Center (FNMOC), the Naval Oceanographic Office (NAVOCEANO), and Air Force

Weather Agency (AFWA) according to the Shared Processing Program agreement.

The DMSP operations and maintenance portion of the FY 2006 budget request is \$84.1 million, the majority of which is for on-orbit satellite operations, long-haul communications, and one dedicated command and control facility. DMSP funds for 120 military and civilian personnel associated with the operation and sustainment of the DMSP command, control, and communications segment.

DMSP and NPOESS Supporting Research: The FY 2006 DOD R&D budget for NPOESS is \$305.5 million for the continued development of system architecture, technology, critical sensors, and algorithms. NPOESS, scheduled to be available in 2010, will exploit advanced hardware and software technologies to produce a more reliable, longer-lived spacecraft with greater mission capability.

U.S. NAVY.

The U. S. Navy FY 2006 budget request for meteorological programs is \$212.1 million. The request includes \$179.8 million for operational programs and \$32.3 million for supporting research.

The Naval Oceanography Program (NOP) remains an unique, world-class program. Focusing support in the environmentally complex coastal/littoral regions around the globe, Naval Meteorology and Oceanography (METOC) personnel (Navy and Marine Corps) are required to provide battlespace awareness for the warfighter by assessing the impact of atmospheric and ocean phenomena on sensor and weapon systems. Additionally, and just as important, the Navy and Marine Corps METOC teams provide for safe flight and navigation in support of naval, joint, and combined

forces operating throughout the world's oceans. This is done with a cadre of highly trained military and civilian personnel, schooled in both the sciences and warfighting applications. By teaming with, and leveraging the efforts of other agencies and activities, the NOP meets these challenges in a most cost-effective manner, providing a full spectrum of products and services with only a small percent of the Federal weather budget.

The NOP is required to provide comprehensive and integrated weather and ocean support worldwide. The Oceanographer of the Navy sponsors programs in four closely related disciplines - meteorology, oceanography, geospatial information services, and precise time and astrometry. All are used to protect ships, aircraft, fighting forces, and shore establishments from adverse ocean and weather conditions, and to provide a decisive tactical or strategic edge by exploiting the physical environment to optimize the performance and efficiency of platforms, sensors, and weapons.

Owing to the crucial interrelationship of the ocean and the atmosphere, Naval METOC requires various oceanographic products to provide the requisite meteorological services. In addition to aviation and maritime METOC support, Navy and Marine Corps METOC teams provide a variety of unique services on demand, such as electro-optical, electro-magnetic and acoustic propagation models and products, METOC-sensitive tactical decision aids, and global sea ice analyses and forecasts.

Support to naval operations is provided under the direction of the Commander, Naval Meteorology and Oceanography Command (CNMOC) located at the Stennis Space Center, Mississippi and the Marine Corps advocate for METOC, the Deputy Commandant for Aviation, at Headquarters Marine Corps, Washington, DC. Naval METOC support starts

with sensing the battlespace physical environment and culminates with weapons arriving on target and personnel operating in the battlespace without being adversely affected by physical environmental phenomena. Operational support for the Navy and Marine Corps includes the day-to-day provision of meteorological and oceanographic (METOC) products and services. As naval operations in the littoral increase, Naval METOC support is directed towards providing on-scene capabilities to personnel that directly furnish environmental data for sensor, weapon system, and personnel planning and employment. These on-scene capabilities are key elements for enabling the warfighters to take advantage of the natural environment as part of battlespace management.

Naval METOC systems acquisition is accomplished through the Program Executive Office for Command, Control, Communications, Computers and Intelligence and Space (C4I and Space) in San Diego, California.

Naval METOC Research and Development (R&D) is cooperatively sponsored by the Oceanographer of the Navy and the Chief of Naval Research. Naval R&D efforts typically have applications to meteorological, oceanographic, and/or tactical systems. Navy's tabulation of budget data includes R&D funding for basic research, applied research, demonstration and validation, and engineering and manufacturing development.

Projects initiated by the Navy and Marine Corps, under sponsorship of the Oceanographer of the Navy, transition from exploratory development to operational naval systems. Such efforts include advances in Naval METOC forecasting capabilities, enhancements to communications and data compression techniques, further development and improvement of models to better predict METOC parameters in littoral regions, and an improved understanding of the impact

these parameters have on sensors, weapon systems, and platform performance.

As the Department of the Navy transforms under SEAPOWER 21, increased emphasis will be placed on the naval force's capabilities for operational maneuverability, precision-guided weapons employment, indefinite sustainment and protection of joint forces. The CNMOC Organization is also currently transforming for efficiency and effectiveness to meet the future requirements for SEAPOWER 21. The Naval METOC Community continues to work closely with research developers and operational forces to ensure that naval and joint force commanders will always have the most accurate, timely, and geo-referenced METOC information available for successful operations.

U.S. ARMY.

The U.S. Army estimates a requirement for \$46.3 million for operational support and \$9.9 million in research and development in FY 2006. The total amount of money budgeted for weather support is estimated because the costs to support U.S. Air Force (USAF) Battlefield Weather forces are normally part of the overall G-3 or G-2 operating budget at the MACOM, Corps, Division, or Brigade level and do not have their own program element or budget line. Operational support is projected to decrease approximately \$24.5 million over the FY 2005 expenditures and research is estimated to decrease about \$5.1 million from the previous year. Staffing will increase slightly. A supplemental budget of over \$24 million for the Meteorological Measuring Set - Profiler (MMS-P) programs in FY 2005 accounts for the significant difference in operational funding levels for the Army from FY 2005 to FY 2006. Increases in staffing are a result of a projected increase in ARYMET units within FORSCOM.

Army monies for meteorology are

spent in four main areas: support to U.S. Army Artillery Met Sections (ARTYMET), support to USAF Battlefield Weather forces at Army locations, research and development related to the Army mission, and the development, production, and maintenance of Army meteorological systems.

U.S. Army Major Commands (MACOMs) with Staff Weather Officers and their associated Battlefield Weather forces provide the same support and services to AFW personnel that they normally provide to Army personnel. This support includes the use of facilities to house weather operations, medical support, access to training facilities, office supplies, utilities and maintenance for weather facilities, vehicles and tactical equipment, and funding for official travel. Eighth U.S. Army, U.S. Army Europe, U.S. Army Pacific, Forces Command, and Training and Doctrine Command all provide this support to Air Force Weather (AFW) personnel assigned at the MACOM level and below.

Major portions of MACOM meteorological budgets go to support Artillery Meteorology Sections, also known as ARTYMET Teams, or Met Sections. Wind data are then passed to the U.S. Army Artillery units for firing computations. Artillery Met Sections range in size from six personnel at a Light Division to twelve personnel at a Heavy Division. Eighth U. S. Army, U.S. Army Europe, U.S. Army Pacific, Forces Command, and the Army National Guard all support Met Sections. Training and Doctrine Command supports twenty-four military and civilian personnel at the U.S. Army Artillery School at Fort Sill, Oklahoma. These personnel train ARTYMET Teams on the use of the AN/TMQ-41 Meteorological Measuring Set. ARTYMET team structures will be changing over the next few years to support the Army's new modularity concept. FORSCOM is already

making these changes to its artillery sections, and other MACOMS will follow as their forces transform to the new units of action. No attempt has been made to convert the part time Army National Guard ARTYMET Teams into full time equivalents.

Space and Missile Defense Command (SMDC) supports several meteorological missions. SMDC has funding designated for the operational support at the High Energy Laser Systems Test Facility (HELSTF) for contract services to operate and maintain the instrumentation, equipment, and facilities to support the atmospheric sciences/meteorological mission. HELSTF has also set aside monies for systems acquisition for repair and replacement of meteorological instrumentation and for data services. SMDC also operates contract support services to operate the Ronald Reagan Missile Defense Test Site for operations support and special weather programs.

Headquarters, Department of the Army, Deputy Chief of Staff, G-2 employs two full-time meteorologists for development of meteorological policy; coordination of meteorological support within the Department of the Army and with other Department of Defense and Federal agencies and organizations; Department of the Army Policy concerning weather; environmental services, and oceanographic support to the Army (less those environmental services functions assigned to the Corps of Engineers); and Department of the Army policy concerning peacetime weather support and point weather warnings. This office also sponsors a company grade Army liaison officer at the Air Force Weather Agency (AFWA) in Omaha, Nebraska, to serve in a consulting role to AFWA. The Air Force provides one full time Staff Weather Officer to serve as a liaison between AFW and the Army Staff.

The Training and Doctrine Command (TRADOC) will program the majority of funds for operations sup-

port related to logistics (expendables), instructor/support personnel, and meteorological system sustainment at the US Army Field Artillery School (USAFAS). The Meteorological Branch at USAFAS (Ft. Sill, OK) employs 25 instructor and support personnel to conduct training using the AN/TMQ-41 Meteorological Measuring Set (MMS). A significant increase in Operational Support Funding is expected in FY 2006 as USAFAS begins to field the AN/TMQ 52 Meteorological Measuring Set Profiler (MMS-P) as a replacement to the MMS. Within the Operational Support Funding, the increases are pinpointed to Logistics (expendables), Instructor Personnel, and Training Development. TRADOC programmed monies in FY 2005 to fund a TRADOC Systems Manager (TSM) position for the Army's Integrated Meteorological System (IMETS). This position falls under the TRADOC Program Integration Office - All Source Analysis System (TPIO-ASAS) at the US Army Intelligence Center and School (USAICS) at Ft Huachuca, AZ. TPIO-ASAS will fund this position in FY 2006. TRADOC transferred funds to Air Combat Command for maintenance/service of the Automated Surface Observing Sensor (ASOS) system at Fort Rucker, AL. Service costs on this system are estimated to increase slightly in FY 2006.

Forces Command (FORSCOM) will program approximately \$14.5 million in FY 2006 for meteorological operations support. This is an increase of nearly \$1.7 million from the previous year to support the addition of 6 new ARTYMET sections. The original FY 2005 plan was for 9 additional ARTYMET sections under Army modularity. In FY 2005 only 3 new sections came on line. This plan allows for the other 6 sections to be added in FY 2006. Over 94 percent of the programmed funds will be used in support of FORSCOM ARTYMET operations

and the remainder will be spent for supplies, travel and other contracts for AFW forces supporting FORSCOM units.

The Army Materiel Command (AMC) will fund a variety of activities for FY 2006, most of which fall into research and development and systems acquisition. AMC will fund developmental and testing costs associated with the Integrated Meteorological System (IMETS). The IMETS budget for FY 2005 underwent a \$11.9 million reduction to fund higher priority needs within the Army. Normal program life cycle issues reduced the Artillery's Profiler budget by \$11.8 million in FY 2005. However, the Profiler program received over \$24 million in FY 2005 through supplemental funding and was able to purchase an additional 22 systems with this money. Three profiler systems are planned for procurement in FY 2006. Other activities within AMC include Army Research Laboratory, Battlefield Environment Division, which will continue to operate an integrated program of both basic and applied research. The Army Research Office will continue basic research activities and will maintain a relatively stable budget in FY 2006. AMC's Field Assistance in Science and Technology (FAST) Activity will fund deployment of new lightweight meteorological systems to test in support of ARTYMET programs.

As a result of changes in the USARIEM research program for FY 2005, there was a reduction in expenditures on weather-related research. It is anticipated that FY 2006 funding for weather-related research efforts at U.S. Army Research Institute of Environmental Medicine (USARIEM) will decrease significantly relative to the FY 2005 Level due to completion of an SBIR.

DEPARTMENT OF HOMELAND SECURITY (DHS)

On March 1, 2004, the Department

of Homeland Security (DHS) assumed primary responsibility for ensuring that emergency response professionals are prepared for any situation in the event of a terrorist attack, natural disaster, or other large-scale emergency. This entails providing a coordinated, comprehensive Federal response to any large-scale crisis and mounting a swift and effective recovery effort. DHS will also prioritize the important issue of citizen preparedness, and educating America's families on how best to prepare their homes for a disaster and tips for citizens on how to respond in a crisis will be given special attention at DHS.

U.S. COAST GUARD (USCG).

All of USCG's funding for meteorological programs is for operations support. For FY 2006, the requested funding level is \$25.0 million. (The Coast Guard does not have a specific program and budget for meteorology--all meteorological activities are accomplished as part of general operations.)

The Coast Guard's activities include the collection and dissemination of meteorological and iceberg warning information for the benefit of the marine community. The Coast Guard also collects coastal and marine observations from its shore stations and cutters, and transmits these observations daily to the Navy's Fleet Numerical Meteorology and Oceanography Center and NOAA's National Weather Service. These observations are used by both the Navy and NOAA in generating weather forecasts.

The Coast Guard also disseminates a variety of weather forecast products and warnings to the marine community via radio transmissions. Coast Guard shore stations often serve as sites for NWS automated coastal weather stations, and the National Data Buoy Center provides logistics support in deploying and maintaining NOAA off-shore weather buoys.

The International Ice Patrol conducts iceberg surveillance operations and

provides warnings to mariners on the presence of icebergs in the North Atlantic shipping lanes. Coast Guard efforts in meteorological operations and services have not changed significantly during recent years.

DEPARTMENT OF THE INTERIOR (DOI)

The total DOI/BLM weather funding request for FY 2006 is \$2.4 million. This amount is for meteorological operations and the support of the Bureau of Land Management (BLM) Remote Automatic Weather Station (RAWS) program. An additional \$1.1 million is recovered each year through reimbursable accounts with participating agencies. Normal operations and maintenance of the RAWS program is approximately \$900,000 yearly. (This includes travel, transportation, utilities, services, supplies, equipment and other non-labor costs.)

Support of the RAWS program by the BLM will continue in FY 2006, as part of the Wildland Fire Agencies' participation in Fire Weather activities and the National Fire Danger Rating System (NFDRS). In addition to upgrading and maintaining fixed-site RAWS, the BLM will address increasing demand for the use of mobile units for both fire and non-fire applications. Continued efforts will be made to achieve an optimum balance of fixed and mobile RAWS resources and support. Cooperation between DOI agencies and the USDA Forest Service regarding combined meteorological requirements for the National Wildland Fire support functions is ongoing. Interagency RAWS activity is coordinated at a working group level with representation by all participants, and will continue to implement NFDRS standards to ensure the protection of both life and property from wildland fires.

DEPARTMENT OF TRANSPORTATION (DOT)

The DOT total budget request for

FY 2006 is \$508.0 million which represents a funding increase of 4.4 percent from FY 2005. The meteorological programs for the Federal Aviation Administration and the Federal Highway Administration, for FY 2006, are described below.

FEDERAL AVIATION ADMINISTRATION (FAA).

For 2006, FAA has requested a total \$504.5 million for the Aviation Weather Programs including acquisition of new systems, operations and support, and supporting research. The actual funding for aviation weather in FY 2005 was \$482.4 million. The \$22.1 million increase in FY 2006 constitutes a 4.5 percent increase in total funding. The changes are comprised of a) increases in acquisitions of \$7.1 million (+8.4 percent) to \$91.1 million, as new systems are required to enhance support of field operations and the aviation industry; b) increases in operations and support of \$14.6 million (+3.9 percent) to \$386.1 million, reflecting salary increases throughout the agency and in associated logistics; and c) a decrease for aviation weather research of \$0.6 million to a total of \$21.5 million.

The funding changes reflect major initiatives in the aviation weather programs to bring much automation to the collection of weather observations from remote sensors, to the dissemination of weather products, graphics and decision making information available for use by the air traffic facilities, pilots, the aviation industry and general aviation users. Specific programs that will see a change in funding greater than \$2 million are listed below:

Programs	Changes (\$ Millions)
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Systems Acquisition:	
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- | | |
|---|-----|
| • Operation and Supportability Information System (OASIS) | 6.2 |
|---|-----|

Operations Support:	
---------------------	--

- | | |
|---------------------------------|-----|
| • Equipment Maintenance | 2.8 |
| • Flight Service Stations (FSS) | 3.3 |

The AWRP will continue research to understand the geophysical phenomenon in the atmosphere and around airports that present hazardous conditions for aircraft operations. Among these are in-flight icing, turbulence, visibility, ceiling, convective activity, tornadoes, etc. Additional work will be done to improve models, develop better graphics for decision making information, and understand the impacts of space weather.

FEDERAL HIGHWAY ADMINISTRATION (FHWA).

The total FHWA request for surface transportation weather programs in FY 2006 is \$3.0 million, all of which will be used for supporting research and special programs.

In 1999, the FHWA began documenting road weather data requirements, which have served as the basis for the majority of work in this area. This work includes addressing the technical aspects of the road transportation system (including environmental data collection, processing, and dissemination) as well as the institutional challenges associated with system implementation.

These institutional challenges encompassed coordination within state and local Departments of Transportation (DOTs) as well as across the transportation and meteorological communities. With regard to technical areas of interest, data collection efforts will include increased coverage of atmospheric and road condition observations, as well as incorporation of road weather data (e.g., pavement and subsurface observations) into broader meteorological observation networks. Better processing includes the application of higher resolution weather models and the development of road condition prediction models (e.g., heat balance models) that are needed to develop the appropriate road weather information.

A new DOT initiative entitled *Clarus*

- the Nationwide Surface Transportation Weather Observing System - will develop and demonstrate a regional road weather observing network and, ultimately, nationwide data sharing capabilities. *Clarus* will allow agencies to share quality controlled environmental data, ultimately improving forecasts and value-added weather information products, as well as supporting anytime, anywhere road weather information for all road and transit users.

A multi-year effort has been undertaken by the FHWA in cooperation with six national laboratories to prototype and field test advanced decision support tools for winter maintenance managers. The Maintenance Decision Support System (MDSS) prototype is a decision support tool that integrates relevant road weather forecasts, coded rules of practice for winter maintenance operations, and maintenance resource data to provide managers with customized road treatment recommendations. The first functional MDSS prototype was demonstrated in Iowa in early 2003 and during winter 2003-2004. During winter 2004-2005, the MDSS prototype was successfully deployed in a third demonstration in Colorado. The current focus of the MDSS project is deployment assistance to assure successful technology transfer to the private sector, who can incorporate MDSS modules into their product lines.

The FHWA is researching how Traffic Management Centers (TMCs) around the country integrate road weather information into their operations. The FHWA is documenting the types of road weather information received by TMCs, the means of information delivery, how information needs change as the severity of a weather event increases, and how that information impacts traffic management decisions. The FHWA is also conducting empirical studies to quantify the impacts of various weather

events on arterial and freeway traffic as well as investigating several other aspects of traffic management with respect to adverse weather, including traffic signal timing, traffic simulation modeling, and freeway operations. These efforts will help FHWA advance the state-of-the-practice in weather-responsive traffic management.

The efforts described above, as well as future activities captured in the Road Weather Management Program plan will be examined within the context of two key reports published in early 2004 and described below.

In 2002, the FHWA asked the National Research Council (NRC) Board of Atmospheric Sciences & Climate to examine what needs to be done from the research, development, and technology transfer perspectives to improve the production and delivery of weather-related information for the nation's roadways. In March 2004, the NRC released a report, *Where the Weather Meets the Road: A Research Agenda for Improving Road Weather Services*, that recommended the creation of a focused, national road weather research program led by FHWA that brings together the transportation and meteorological communities, identifies research priorities, and implements new scientific and technological advances. NRC recommendations included making better use of existing road weather information and technologies to increase capabilities for transportation research, establishing a nationwide real-time road weather observing system, developing observing capabilities to assess the accuracy of road weather forecasts, improving environmental sensor technologies, and developing new means to effectively communicate road weather information to a wide range of users.

To strengthen relationships between the meteorological and surface transportation communities, the FHWA Road Weather Management Program

also co-sponsored the American Meteorological Society (AMS) Policy Forum on Weather and Highways in November 2003, to discuss provision of weather information to improve highway operations, development of strategies to effectively respond to weather information, and policy issues related to effective application of weather services to the management of the nation's highway system. The forum brought together nearly 100 representatives from public, private, and academic sectors at federal, state, and local levels. The report resulting from the forum, *Weather and Highways: Report of a Policy Forum*, included several recommendations including long-term congressional funding to develop a national road weather research, development, and applications program; close coordination of federal and state DOTs to improve the safety and efficiency of highways during adverse weather; and establishing a national road weather data collection, processing, and dissemination system.

Based upon recommendations in the AMS and NRC reports, the FHWA has partnered with the National Oceanic and Atmospheric Administration (NOAA) to achieve shared goals for a safer and more efficient surface transportation system. By working together the agencies can take advantage of the other's investments and expertise as well as promote improved surface transportation weather training, products, and services. A near-term goal of the new partnership is the introduction of new products, services and training to improve the application of weather information to surface transportation operations. Significant investments beyond current budget levels will be needed to address all of the recommendations in the two reports.

FEDERAL RAILROAD ADMINISTRATION (FRA).

In 2006, the FRA requested a significant increase in Nationwide Differen-

tial Global Positioning System (NDGPS) funding to accelerate construction of additional NDGPS sites. Thus, FRA plans to transfer approximately \$424,500 to NOAA's Forecast Systems Laboratory in 2006.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

All of the EPA's funding of meteorological and air quality programs is for supporting research. The anticipated funding level in FY 2006 for directed meteorological research is \$9.0 million, which is the same funding level as in FY-2005.

Currently, increased attention is being paid to the effects of airborne toxins and fine particulate matter on human health, on the effect of climate change on air quality, and the impact on ecosystems. In addition, to promote excellence in environmental science and engineering, EPA established a national fellowship program and substantially increased its support for investigator-initiated research grants. The funding for grants (with reliance on quality science and peer review) and for graduate fellowships (to support the education and careers of future scientists) will provide for a more balanced, long-term capital investment in improved environmental research and development.

The funding for the grants program will remain about the same in FY 2006 as in FY 2005. This program will fund research in areas including ecological assessment, air quality, environmental fate and treatment of toxins and hazardous wastes, effects of global climate change on air quality, and exploratory research. The portion of these grants that will be awarded for meteorological research during FY 2006 cannot be foreseen, but it is probable that the grant awards will increase the base amount of \$9.0 million listed above for directed meteorological research.

In collaboration with NOAA, EPA is continuing its development and evalu-

ation of air quality models for air pollutants on all temporal and spatial scales as mandated by the Clean Air Act as amended in 1990. Research will focus on urban, mesoscale, regional, and multimedia models, which will be used to develop air pollution control strategies, human and ecosystem exposure assessments, and air quality forecasting. There will be increased emphasis placed on meteorological research into regional and urban formation and transport of air contaminants in support of the revisions to the National Ambient Air Quality Standards and homeland security. Increased efficiency of computation and interpretation of results are being made possible by means of supercomputing and scientific visualization techniques.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

For FY 2006, NASA requests a total of \$165.2 million. The majority of this funding (\$162.6 million) is for supporting research.

The meteorology supporting research programs lie within the Earth-Sun System Division of NASA's Sci-

ence Mission Directorate (SMD). Due to recent organizational changes, the task of extracting meteorology related funds in the SMD budget has become a complicated undertaking. The line items in the Earth-Sun System budget that support Earth Science are Earth Systematic Missions, Earth System Science Pathfinder, Earth-Sun System Multi-Mission Operations, Earth-Sun Research, Applied Sciences, Education and Outreach and Earth-Sun Technology. Estimation of the meteorology share of this budget was a two step process. The Earth Science part of the budget was estimated in the first step and the meteorology share was estimated, in the second step, to be one eighth of this sum.

NUCLEAR REGULATORY COMMISSION (NRC)

The NRC planned expenditure of \$120,000 in FY 2006, is for meteorological operations to continue technical assistance for the analysis of atmospheric dispersion for routine and postulated accidental releases from nuclear facilities, and the review of proposed sites for possible construction of new nuclear power plants.

The meteorological support program

in the NRC is focused primarily on analyzing and utilizing meteorological data in atmospheric transport and dispersion models. These models provide insight on plume pathways in the near- and far-fields for building wake and dispersion characteristics to perform dose calculations on postulated releases to the environment. Meteorological information is used as input to the probabilistic safety assessment, the assessment of the radiological impacts of routine releases from normal operations, the assessment of other (non-radiological) hazards that may impact safe operation of the facility, and the assessment of design or operational changes proposed for the facility.

Additionally, after a hiatus of some 25 years, the nuclear power industry has expressed an interest in seeking site approvals for new nuclear power plants. Three early site permit applications have been received and are currently under review. These reviews will also consider regional climatology and local meteorology. In addition to its internal review activities, the NRC may seek assistance from other Federal agencies to support its safety reviews.

AGENCY FUNDING BY BUDGET CATEGORY

Table 2.2 depicts how the agencies plan to obligate their funds for meteorological operations broken down by "budget category." The two major categories are "Operations Support" and "Systems Acquisition." To a large degree, these categories correspond to non-hardware costs (Operations Support) and hardware costs (Systems Acquisition). For agency convenience in identifying small components that do not fit into these two major categories, a third category is added called "Special Programs." Programs that provide

support to several government agencies such as the Air Force's DMSP are listed on a separate line.

In FY 2006, Operational Costs requested are \$2.98 billion with a total of \$1.85 billion (62.2 percent) for Operations Support, \$1.09 billion (36.8 percent) for Systems Acquisition, and \$31.4 million (1.1 percent) for Special Programs.

Table 2.3 describes how the agencies plan to obligate their funds for meteorological supporting research according to budget categories. The agencies' support-

ing research budgets are subdivided along similar lines--Research and Development (non-hardware), Systems Development (hardware), and Special Programs (for those items that do not easily fit into the two major categories).

For FY 2006, agencies will obligate a total of \$386 million in Supporting Research funds in the following manner: \$297.6 million (77.1 percent) to research and development and \$88.5 million (22.9 percent) to Systems Development.

AGENCY FUNDING BY SERVICE CATEGORY

Table 2.4 summarizes how the agencies plan to obligate operational funds for basic and specialized meteorological services; Table 2.5 is a similar breakout for supporting research funds.

Table 2.4 reveals the distribution of FY 2006 operational funds: basic meteorology services receiving 57.8 percent; aviation 20.1 percent; marine 5.3 percent; agriculture/forestry 0.6 percent; general military services 15.9 percent; and other specialized services accounting for 0.4 percent. Table 2.5 shows the distribution of supporting research funds among the services with basic meteorology receiving 25.0 percent, aviation 6.0 percent, marine 8.5 percent, agriculture and forestry 7.3 percent, general military 7.9 percent, and the remaining 45.2 percent dedicated to other meteorological services.

The definitions of specialized and basic services are described below:

Basic Services.

Basic services provide products that meet the common needs of all users and include the products needed by the general public in their everyday activities and for the protection of lives and property. "Basic" services include the programs and activities that do not fall under one of the specialized services.

Specialized Meteorological Services.

Aviation Services. Those services and facilities established to meet the requirements of general, commercial, and military aviation.

Marine Services. Those services and facilities established to meet the requirements of the DOC, DOD, and DOT on the high seas, on coastal and inland waters, and for boating activities in coastal and inland waters. The civil programs which are directly related to services solely for marine uses and military programs supporting fleet, amphibious, and sea-borne

units (including carrier-based aviation and fleet missile systems) are included.

Agriculture and Forestry Services. Those services and facilities established to meet the requirements of the agricultural industries and Federal, state, and local agencies charged with the protection and maintenance of the nation's forests.

General Military Services. Those services and facilities established to meet the requirements of military user commands and their component elements. Programs and services which are part of basic, aviation, marine, or other specialized services are not included.

Other Specialized Services. Those services and facilities established to meet meteorological requirements that cannot be classified under one of the preceding categories; such as, space operations, urban air pollution, global climate change, and water management.

PERSONNEL ENGAGED IN METEOROLOGICAL OPERATIONS

Table 2.6 depicts agency staff resources in meteorological opera-

tions. The total agency staff resources requested for FY 2006 is 16,365. This

total represents a decrease of 0.5 percent from FY 2005.

TABLE 2.2 AGENCY OPERATIONAL COSTS, BY BUDGET CATEGORY
(Thousands of Dollars)

AGENCY	Operations Support		Systems Acquisition		Special Programs		Total		% of FY2006 TOTAL
	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	
Agriculture	15355	15535	0	0	0	0	15355	15535	0.5
Commerce/NOAA(Subtot)	915037	933032	795361	882207	17323	24530	1727721	1839769	61.6
NWS	703926	744830	63973	72303	15082	22130	782981	839263	28.1
NESDIS	174975	152738	731388	809904	1085	1244	907448	963886	32.3
OAR	0	0	0	0	0	0	0	0	0.0
NOS	23802	23130	0	0	0	0	23802	23130	0.8
NMAO	12334	12334	0	0	1156	1156	13490	13490	0.5
Defense(Subtot)	468600	492384	152768	126096	888	1166	622256	619646	20.7
Air Force	250250	260324	42970	49077	0	0	293220	309401	10.4
DMSP*	14571	16946	73467	67175	0	0	88038	84121	2.8
Navy	168999	178580	1192	1229	0	0	170191	179809	6.0
Army	34780	36534	35139	8615	888	1166	70807	46315	1.5
Homeland Security (Subtot)	23890	25020	0	0	0	0	23890	25020	0.8
USCG	23890	25020	0	0	0	0	23890	25020	0.8
Interior/BLM	2400	2400	0	0	0	0	2400	2400	0.1
Transportation(Subtot)	371780	386620	84019	91107	4635	5723	460434	483450	16.2
FAA	371639	386197	84019	91107	4635	5723	460293	483027	16.2
FRA	141	423	0	0	0	0	141	423	0.0
FHWA	0	0	0	0	0	0	0	0	0.0
EPA	0	0	0	0	0	0	0	0	0.0
NASA	2348	2435	260	180	0	0	2608	2615	0.1
NRC	120	120	0	0	0	0	120	120	0.0
TOTAL	1799530	1857546	1032408	1099590	22846	31419	2854783	2988554	100.0
% of FY TOTAL	63.0%	62.2%	36.2%	36.8%	0.8%	1.1%	100.0%	100.0%	

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.3 AGENCY SUPPORTING RESEARCH COSTS, BY BUDGET CATEGORY
(Thousands of Dollars)

AGENCY	Research & Development		Systems Development		Special Programs		Total		% of FY2006 TOTAL
	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	
Agriculture	36702	28280	0	0	0	0	36702	28280	7.3
Commerce/NOAA(Subtot)	88958	71683	18080	18256	0	0	107038	89939	23.3
NWS	6430	7494	15710	15886	0	0	22140	23380	5.6
NESDIS	31039	26214	0	0	0	0	31039	26214	6.8
OAR	50333	36819	1870	1870	0	0	52203	38689	10.0
NOS	0	0	500	500	0	0	500	500	0.1
NMAO	1156	1156	0	0	0	0	1156	1156	0.3
Defense(Subtot)	48557	57147	15094	14656	429	0	64080	71803	18.6
Air Force	5474	14937	11278	13738	0	0	16752	28675	7.4
DMSP*	0	0	3816	918	0	0	3816	918	0.2
Navy	28512	32312	0	0	0	0	28512	32312	8.4
Army	14571	9898	0	0	429	0	15000	9898	2.6
Homeland Security (Subtot)	0	0	0	0	0	0	0	0	0.0
USCG	0	0	0	0	0	0	0	0	0.0
Interior/BLM	0	0	0	0	0	0	0	0	0.0
Transportation(Subtot)	26215	24506	0	0	0	0	26215	24506	6.3
FAA	22145	21506	0	0	0	0	22145	21506	5.6
FRA	0	0	0	0	0	0	0	0	0.0
FHWA	4070	3000	0	0	0	0	4070	3000	0.8
EPA	9000	9000	0	0	0	0	9000	9000	2.3
NASA	109700	107000	66300	55600	0	0	176000	162600	42.1
NRC	0	0	0	0	0	0	0	0	0.0
TOTAL	319132	297616	99474	88512	429	0	419035	386128	100.0
% of FY TOTAL	76.2%	77.1%	23.7%	22.9%	0.1%	0.0%	100.0%	100.0%	

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.4 AGENCY OPERATIONAL COSTS, BY SERVICE
(Thousands of Dollars)

AGENCY	Basic		Aviation		Marine		Agriculture & Forestry		General		Other		Total	
	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006
Agriculture	0	0	0	0	0	0	15355	15635	0	0	0	0	15355	15535
Commerce/NOAA(Subtot)	1590891	1695671	63700	63700	73130	80398	0	0	0	0	0	0	1727721	1839769
NWS	669953	718295	63700	63700	49328	57268	0	0	0	0	0	0	782981	839263
NESDIS	907448	963886	0	0	0	0	0	0	0	0	0	0	907448	963886
OAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOS	0	0	0	0	23802	23130	0	0	0	0	0	0	23802	23130
NMAO	13490	13490	0	0	0	0	0	0	0	0	0	0	13490	13490
Defense(Subtot)	28932	30568	51501	53983	49355	52145	0	0	483957	473961	8511	8989	622256	619646
Air Force	0	0	0	0	0	0	0	0	293220	309401	0	0	293220	309401
DMSP*	0	0	0	0	0	0	0	0	88038	84121	0	0	88038	84121
Navy	28932	30568	51057	53943	49355	52145	0	0	32336	34164	8511	8989	170191	179809
Army	0	0	444	40	0	0	0	0	70363	46275	0	0	70807	46315
Homeland Security (Subtot)	0	0	0	0	23890	25020	0	0	0	0	0	0	23890	25020
USCG	0	0	0	0	23890	25020	0	0	0	0	0	0	23890	25020
Interior/BLM	0	0	0	0	0	0	2400	2400	0	0	0	0	2400	2400
Transportation(Subtot)	0	0	460293	483027	0	0	0	0	0	0	141	423	460434	483450
FAA	0	0	460293	483027	0	0	0	0	0	0	0	0	460293	483027
FRA	0	0	0	0	0	0	0	0	0	0	141	423	141	423
FHWA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NASA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRC	120	120	0	0	0	0	0	0	0	0	2608	2615	2608	2615
TOTAL	1619943	1726359	575494	600710	146375	157563	17755	17935	483957	473961	11260	12027	2854783	2988554
% of FY TOTAL	56.7%	57.8%	20.2%	20.1%	5.1%	5.3%	0.6%	0.6%	17.0%	15.9%	0.4%	0.4%	100.0%	100.0%

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.5 AGENCY SUPPORTING RESEARCH COSTS, BY SERVICE
(Thousands of Dollars)

AGENCY	Basic		Aviation		Marine		Agriculture & Forestry		General Military		Other		Total	
	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006	FY2005	FY2006
Agriculture	0	0	0	0	0	0	36702	28280	0	0	0	0	36702	28280
Commerce/NOAA(Subtot)	104913	87814	1625	1625	500	500	0	0	0	0	0	0	107038	89939
NWS	22140	23380	0	0	0	0	0	0	0	0	0	0	22140	23380
NESDIS	31039	26214	0	0	0	0	0	0	0	0	0	0	31039	26214
OAR	50578	37064	1625	1625	0	0	0	0	0	0	0	0	52203	38689
NOS	0	0	0	0	500	500	0	0	0	0	0	0	500	500
NMAO	1156	1156	0	0	0	0	0	0	0	0	0	0	1156	1156
Defense(Subtot)	13519	8798	0	0	28512	32312	0	0	22049	30693	0	0	64080	71803
Air Force	0	0	0	0	0	0	0	0	16752	28675	0	0	16752	28675
DMSP*	0	0	0	0	0	0	0	0	3816	918	0	0	3816	918
Navy	0	0	0	0	28512	32312	0	0	0	0	0	0	28512	32312
Army	13519	8798	0	0	0	0	0	0	1481	1100	0	0	15000	9898
Homeland Security (Subtot)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USCG	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior/BLM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation(Subtot)	0	0	22145	21506	0	0	0	0	0	0	4070	3000	26214.6	24506
FAA	0	0	22145	21506	0	0	0	0	0	0	0	0	22144.6	21506
FRA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FHWA	0	0	0	0	0	0	0	0	0	0	4070	3000	4070	3000
EPA	0	0	0	0	0	0	0	0	0	0	9000	9000	9000	9000
NASA	0	0	0	0	0	0	0	0	0	0	176000	162600	176000	162600
NRC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	118432	96612	23770	23131	29012	32812	36702	28280	22049	30693	189070	174600	419034.6	386128
% of FY TOTAL	28.3%	25.0%	5.7%	6.0%	6.9%	8.5%	8.8%	7.3%	5.3%	7.9%	45.1%	45.2%	100.0%	100.0%

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.6 PERSONNEL ENGAGED IN METEOROLOGICAL OPERATIONS
(Units are Full Time Equivalent Staff Years)*

<u>AGENCY</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>% CHANGE</u>	<u>% of FY 2006 TOTAL</u>
Agriculture	236	234	-0.8	1.4
Commerce/NOAA (Subtotal)	5,717	5,714	-0.1	34.9
NWS	4,654	4,651	-0.1	28.4
NESDIS	870	870	0.0	5.3
OAR	32	32	0.0	0.2
NOS	107	107	0.0	0.7
NMAO	54	54	0.0	0.3
Defense	6,691	6,571	-1.8	40.2
Air Force (Subtotal)	4,714	4,714	0.0	28.8
Air Force Weather	4,594	4,594	0.0	28.1
DMSP	120	120	0.0	0.7
Navy	1,665	1,522	-8.6	9.3
Army	312	335	7.4	2.0
Homeland Security (Subtotal)	108	108	0.0	0.7
USCG	108	108	0.0	0.7
Interior/BLM (Subtotal)	28	28	0.0	0.2
Interior	26	26	0.0	0.2
Reimbursed**	2	2	0.0	0.0
Transportation (Subtotal)	3,662	3,708	1.3	22.7
FAA	3,659	3,705	1.3	22.6
FHWA	3	3	0.0	0.0
EPA	0	0	0.0	0.0
NASA	0	0	0.0	0.0
NRC	2	2	0.0	0.0
 TOTAL	 16,444	 16,365	 -0.5	 100.0

* Numbers of personnel are rounded to nearest whole number.

** "Reimbursed" are personnel funded by other agencies.

INTERAGENCY FUND TRANSFERS

Table 2.7 summarizes the reimbursement of funds from one agency to another during FY 2005. Agencies routinely enter into reimbursable agreements when they determine that one agency can provide the service more efficiently and effectively than the other. While specific amounts may vary from year-to-year, the pattern shown is essentially stable and reflects a significant level of interagency cooperation.

Department of Commerce. NESDIS will transfer a total of \$291.0 million to NASA for procurement and launches of polar-orbiting (\$86.2 million) and geostationary (\$204.8 million) satellites.

Department of Defense. The Air Force will reimburse DOC a total of \$4.64 million for operations [e.g., OFCM support (\$170,000), Lightning Data (\$638,000), NCEP operations (\$14,000), WSR-88D support (\$2,531,000), COMET training development (\$200,000), geomagnetic data (\$215,000), and IPO support (\$162,000)]. In addition, the Air Force will reimburse NASA \$213,000 for a variety of data and USGS \$300,000 for the purchase of a magnetometer. The Navy will reimburse DOC \$209,000 for basic climatological analysis and forecasting, and interagency coordination. The Army reimbursements to DOC/NOAA include \$569,000 from COE to NWS for maintaining precipitation reporting stations. The U.S. Geological Survey will also be reim-

bursed \$500,000 by the Army's COE for operations and maintenance of hydrologic and precipitation reporting stations.

Department of Transportation. The FAA will reimburse NOAA \$32.2 million for FY 2006. Included in those funds are development of enhancements and operational support associated with the WSR-88D, ASOS maintenance, the Center Weather Service Units at all Air Route Traffic Control Centers, the World Area Forecast System, meteorology instructors at the FAA, studies, and OFCM support. The FAA will also reimburse the DOD a total of \$3.3M for supporting research.

The FRA transferred \$141,500 to NOAA's Forecast Systems Laboratory in 2005 to fund the purchase of weather sensing equipment which was installed at the Nationwide Differential Global Positioning System sites constructed in 2005. In 2006, FRA requested a significant increase in NDGPS funding to accelerate construction. Thus, FRA plans to transfer approximately \$424,500 to Forecast Systems Laboratory in 2006.

National Aeronautics and Space Administration (NASA). The Air Force will be reimbursed a total of \$1.599 million--\$1.444 million for observations, forecasts, and operations/maintenance of weather infrastructure and replacement of upper air systems at Trans-Atlantic Abort Landing Sites and \$155 million for operation and maintenance of weather tow-

ers at Edwards AFB, CA. The UCAR will receive \$20,000 for data analysis to improve lightning launch commit criteria. The National Data Buoy Center will receive reimbursements of \$133,000 for the operation of two data buoys.

Environmental Protection Agency (EPA). NOAA's Air Resources Laboratory (ARL) will receive \$6.7 million for development, evaluation, and application of air quality dispersion models; and for provision of meteorological expertise and guidance for EPA policy development activities.

Nuclear Regulatory Commission (NRC). The NRC enjoys a unique relationship with the DOE as a result of the Energy Reorganization Act of 1974. The act realigned the Atomic Energy Commission into a regulatory organization-NRC and a research and promotional organization-ERDA (which was subsequently absorbed into DOE). As a result, the NRC has access to the DOE national laboratories for technical assistance activities. This assistance, while not a reimbursable agreement, results in the transfer of funds from NRC for specific technical assistance by DOE laboratories. In FY 2005, the NRC expects to task DOE laboratories and the National Oceanic and Atmospheric Administration's National Climatic Data Center at a funding level of \$120,000.

FACILITIES/LOCATIONS FOR TAKING METEOROLOGICAL OBSERVATIONS

Table 2.8 indicates the number of facilities/locations or platforms at

which the Federal agencies carry out (or supervise) the taking of various

types of meteorological observations.

TABLE 2.7 INTERAGENCY FUND TRANSFERS FOR METEOROLOGICAL
OPERATIONS AND SUPPORTING RESEARCH

<u>Agency Funds Transferred from:</u>	<u>Agency Funds Transferred to:</u>	FY 2004 Funds (\$K)	
		<u>Operations</u>	<u>Supporting Research</u>
Commerce/NOAA	NASA (Polar satellite acquisition)	86,200	
	NASA (Geo satellite acquisition)	204,800	
Defense/Air Force	OSDP	53	
	DOC/NOAA/NWS/NCEP	14	
	DOC/NOAA/NWS/OS6		200
	DOC/NOAA/NWS	638	
	DOC/NOAA/OFCM	170	
	DOC/NOAA/NPOESS/IPO	136	
	DOC/NOAA/NWS/SEC	215	
	DOC/NOAA/NESDIS/IPO	26	
	DOC/NOAA/NWS		727
	DOC/NOAA/NWS	1804	
	DOC/NOAA/NWS		138
	DOC/NOAA/NWS	517	
	DOI/USGS	300	
	NASA		190
	NASA	23	
	NSF		140
Defense/Navy	DOC/NOAA/NCDC	44	
	DOC/NOAA/OFCM	165	
Defense/Army	DOC/NOAA/NWS	569	
	DOI/USGS	500	
	DOD/USAF/ACC	60	
Transportation/FAA	DOC/NOAA	24,865	7,310
	DOD/USAF		2,800
	DOD/USN		540
Transportation/FRA	DOC/NOAA	141	
NASA	DOD/USAF/45th SW	1,444	
	DOD/USAF/Edwards AFB	155	
	DOC/NOAA/NDBC	133	
	UCAR		20
EPA	DOC/NOAA/OAR		6,700
NRC	DOE/PNNL	120	

TABLE 2.8 FACILITIES/LOCATIONS FOR TAKING METEOROLOGICAL OBSERVATIONS

TYPE OF OBSERVATION/AGENCY	No. of Locations (FY 2004)	TYPE OF OBSERVATION/AGENCY	No. of Locations (FY 2004)
<u>Surface, land</u>		<u>Upper air, rocket</u>	
Commerce (all types)	841	Army (U.S. & Overseas)	1
Air Force (U.S. & Overseas)	162		
Navy (U.S. & Overseas)	72	<u>Doppler weather radar (WSR-88D) sites</u>	
Marine Corps (U.S. & Overseas)	13	Commerce (NWS)	123
Army (U.S. & Overseas)	45	Air Force (U.S. & Overseas)	26
Transportation (Flight Service Stn)	8	Army (U.S. & Overseas)	3
Transportation (Lim Aviation Wx Rptg Stn)	114	Transportation (Off CONUS)	12
Transportation (Contract Wx Obsg Stn)	189		
Transportation (Auto Wx Obsg Stn)	198	<u>Doppler weather radar (Not WSR-88D) sites</u>	
Transportation (Road Wx Obsg Stn)	2,149	Air Force (Transportable)	9
Transportation (Auto Sfc Obsg Sys, fielded)	569	Army	2
Homeland Security (USCG Coastal)	50	Navy (Fixed)	9
Interior	470	Marine Corps (Mobile)	10
Agriculture	1567		
NASA (all types)	46	<u>Off-site WSR-88D Processors (PUPs)</u>	
		Commerce (NWS)	63
<u>Surface, marine</u>		Air Force	59 (+38 OPUPs)
Commerce (SEAS-equipped ships)	140	Navy (U.S. and Overseas)	24
Commerce (Coastal-Marine Autom Network)	65	Marine Corps (U.S. & Overseas)	9
Commerce (NOAA/NOS/PORTS)	6	Army	1
Commerce (Buoys--moored)	64	Transportation	25
Commerce (Buoys--drifting)	21	NASA	1
Commerce (Buoys--large navigation)	10		
Commerce (Water-level gauges)	*175	<u>Airport Terminal Doppler weather radars</u>	
*Number of which have meteorology sensors	59	Transportation (Commissioned)	45
Navy (Ships with met personnel)	29	Army (not airfield--Test Range/USAREUR)	2
Navy (Ships without met personnel)	288		
Homeland Security (USCG Cutters)	232	<u>Conventional radar (non-Doppler) sites</u>	
NASA	2	Commerce (NWS)	31
		Commerce (at FAA sites)	27
<u>Upper air, balloon</u>		Air Force, Mobile Units	23
Commerce (U.S.)	86	Marine Corps, Mobile units	15
Commerce (Foreign, Cooperative)	22	Army (U.S. and Overseas)	4
Air Force, Fixed (U.S. & Overseas)	12	Transportation (FAA (WSP))	34
Air Force, Mobile	15		
Army, Fixed (U.S. & Overseas)	18	<u>Weather reconnaissance (No. of aircraft)</u>	
Army, Mobile (U.S. and Overseas)	87	Commerce (NAMO)	3
Navy, Fixed (U.S. & Overseas)	11	Air Force Reserve Command (AFRC)	10
Navy, Mobile(U.S. & Overseas)	47		
Navy, Ships	29	<u>Geostationary meteorological satellites (No. operating)</u>	
Marine Corps, Mobile	10	Commerce (planned config of 2)	2
NASA (U.S.)	1		
		<u>Polar meteorological satellites (No. operating)</u>	
<u>Atmospheric Profilers</u>		Commerce (2 primary, 4 standby)	6
Army	9	Air Force (2 primary, 3 standby)	5
NASA	1	Navy (WINDSAT AND GFO)	2

